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EIA Projections of Renewable Energy Costs

Forum on the Economic Impact Analysis of NJ's Proposed 20% RPS

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February 22, 2005

Background

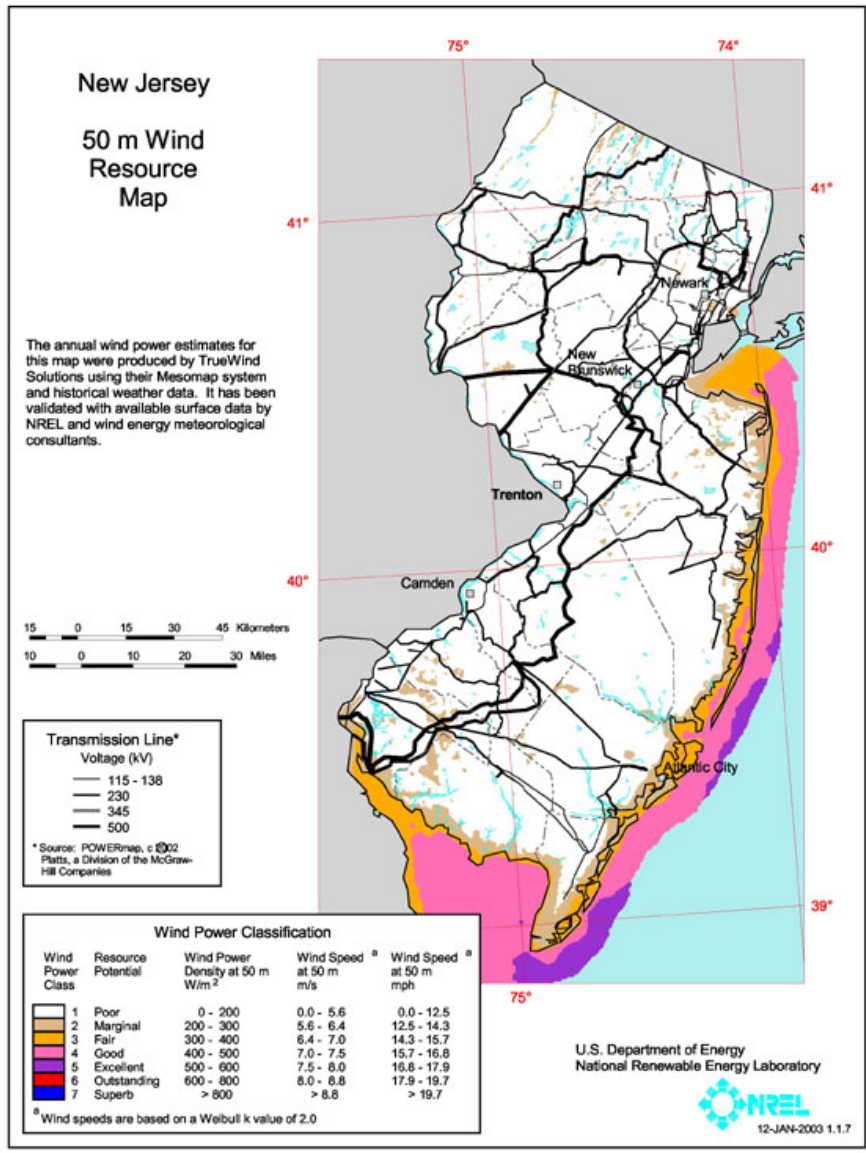
- EIA provides independent analysis and forecasting of domestic energy markets
  - Annual Energy Outlook provides baseline forecast assuming current policy and regulation
  - EIA also performs analyses of national energy policy as requested
- National Energy Modeling System (NEMS) is primary forecast and analysis tool
  - Represents energy supply, demand, and conversion (electricity, refining) sectors, as well as macro economic feedback
  - Regional level input and results
  - Renewables are largely represented in the electric power sector, using NERC regions

Wind Power

- Wind currently costs around $1100/kW
  - Minimal cost decline expected in mid-term
  - Consistent with observed cost trends over past 5-10 years
- Performance ranges from 32% (Class 4) to 42% (Class 6)
  - Performance expected to increase in mid-term
  - Performance has driven cost-of-energy declines in wind power
- Intermittency affects cost/value
  - Value is less when wind tends to blow off-peak (as it does inland in Mid-Atlantic)
  - Less reliability value and potential additional grid operating cost
    - Resources in Mid-Atlantic (next slide) will likely limit wind penetration before grid reliability becomes a significant issue
- PTC is critical to achieving cost-competitiveness for wind
  - But with the PTC, wind is very competitive

Wind Resources

- MAAC is resource limited
  - Less than 1,000 MW of resource, Class 4 or better
- Anecdotal evidence that PJM projects are already utilizing Class 3 resources
  - Implies that much of the <1 GW of Class 4 resource is relatively expensive/unavailable
- Resources in NY, NE, and ECAR (PJM West) could also serve NJ
  - PA, MD, NY, and various New England states have their own RPS, and will be competing for scarce resources

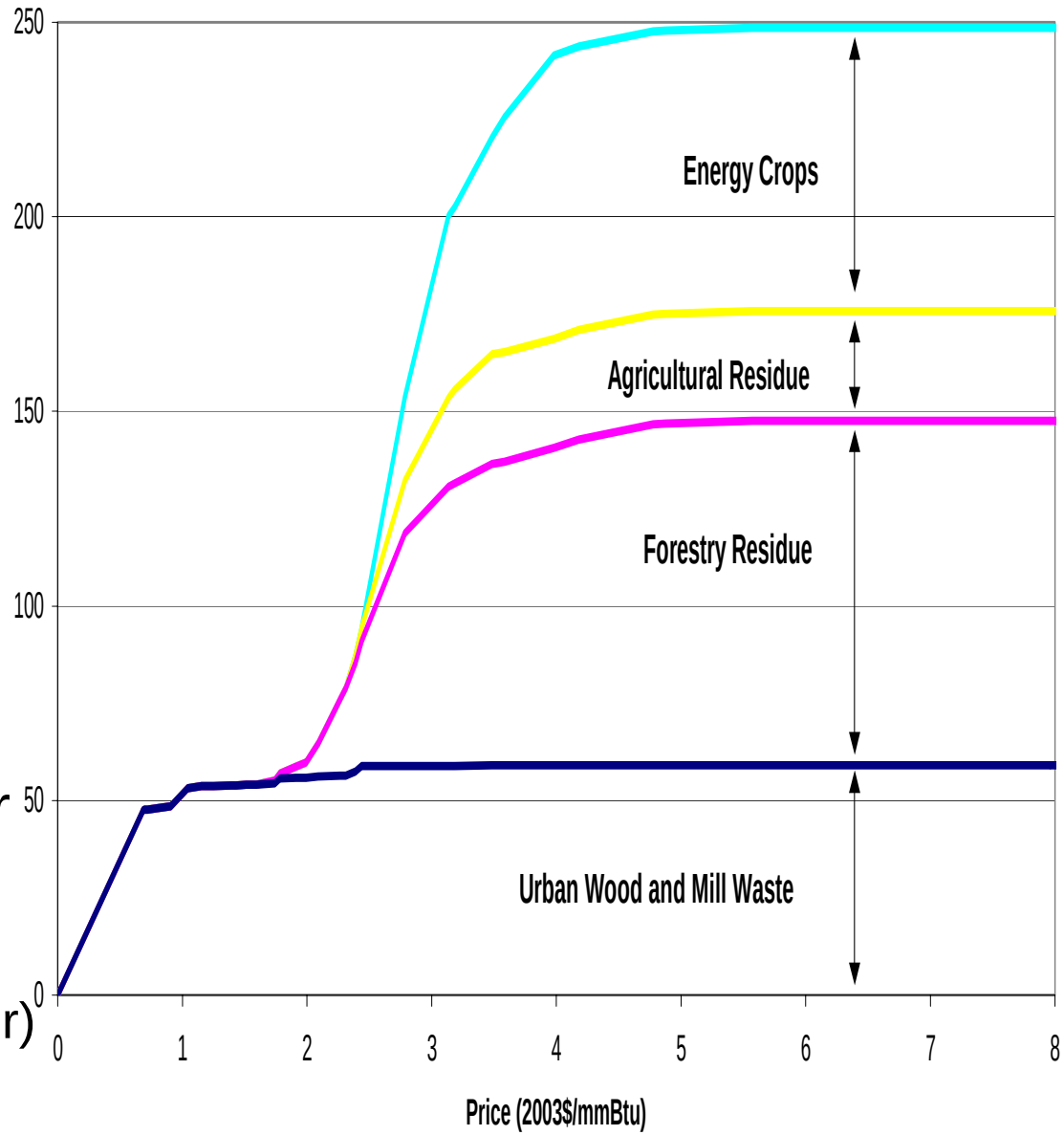


Offshore wind

- EIA does not model offshore wind
- Costs are *highly* uncertain in both directions
  - Current European experience represents pilot/early commercialization, presumably with significant “learning” possible
  - On the other hand, Europe is building on “prime” locations with shallow water relatively near shore
  - Need studies in U.S. of wind resource vs. depth and distance from shore (and good cost functions to match)
  - Could mimic on-shore cost patterns where “learning” is used to improve performance (get deeper/further from shore) rather than for capital cost reduction
- Current regulatory regime is uncertain
  - Proposals in MA and NY are forcing ad hoc process
  - Congress could still act

Biomass

- Cost
  - Approx. $1700/kW
  - Cost reductions can “borrow” from allied technologies (coal IGCC, gas CC)
  - 8911 Btu/kWh
- Resources
  - Approx. 250 trillion Btu/yr in NJ,NY,PA
  - About 65 trillion Btu/yr below $2/mmBtu
    - Roughly 840-980 MW (@ 85% capacity factor)



Landfill Gas

- Cost
  - Site specific
  - Approx. $1400/kW (conventional generators)
- Resources
  - Very limited
  - Approx. 425 MW in MAAC

Solar (PV)

- Cost
  - $6,000/kW for commercial building installation (25 kW system)
  - $8,200/kW for residential installation (2kW)
  - Large potential for cost reduction
  - With significant cost reduction and Federal tax incentives, could achieve modest market share in mid-term (about 2 GW nationally by 2025), when competing against peak retail power rates
- Resources
  - Unlimited (effectively)
  - Lowest cost installations will be on new construction
  - Despite increasing competitiveness, expected to remain too expensive for widespread adoption.

New Fossil Capacity

- NGCC
  - High fuel cost ($4.25-5.50/mmBtu forecasted)
  - Low capital cost (approx. $520/kW)
  - 6350 Btu/kWh
- Coal (conventional and IGCC)
  - Low fuel cost ($1.25-1.30/mmBtu forecasted)
  - High capital cost (approx. $1250-1300/kW)
  - 7200-8600 Btu/kWh
  - IGCC has significant cost reduction potential
    - Will benefit Biomass IGCC as well

Questions?

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